

ABSTRACT

Semiconductor devices and methods to form a contact of a semiconductor device are disclosed. An example method to form a contact includes forming an insulating layer on a substrate; etching the insulating layer to form a contact hole; depositing a silicon layer on sidewalls and an undersurface of the contact hole; forming a silicon spacer on the sidewalls of the contact hole by etching the silicon layer; transforming the silicon spacer to a silicon nitride spacer; depositing a diffusion barrier on the silicon nitride spacer; and filling the contact hole with tungsten. Because the silicon nitride spacer formed on the sidewalls of the contact hole can serve as a leakage current blocking layer, the yield and the reliability of the semiconductor devices manufactured by this example process are enhanced.